SVP242E Dual-Channel HD+Four-Channel SD Video Capture Card User Manual V1.02

Solution

Application Note

Datasheet

Document Title:	SVP242E Dual-Channel HD + Four-Channel SD Video Capture Card User Manual V1.02
Version:	1.02
Date:	2012-06-18
Status:	Release
Document Control ID:	SVP242E Dual-Channel HD + Four-Channel SD Video Capture Card User Manual V1.02

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Version History

Version	Date	Add/Del/Rev
V1.00	2011-3-16	New version
V1.01	2012-2-11	Add audio equipment description explanation
V1.02	2012-6-18	Modify product manual according to the systech template format

Contents

1 Preface.....8

2 Product introduction..... 8

2.1 Product Feature.....8

2.2 Advanced Feature.....9

2.3 Product Specifications.....9

2.4 Standard Accessory..... 10

3 Minimum Hardware Configuration..... 11

4 Recommended Hardware Configuration..... 11

5 System Requirements..... 11

6 Hardware and Driver Installation..... 12

6.1 Parts List..... 12

6.2 Install SVP242E:.....12

7 Connection of HD Input.....13

7.1 DVI-D/DVI-I Signal..... 13

7.2 HDMI Signal.....13

7.3 VGA Signal（RGB-HV）.....14

7.4 YPbPr Signal.....14

7.5 CVBS..... 14

8 Connection of SD Input.....15

9 Connection of Audio Signal..... 15

10 Video Capture Device Instruction..... 16

10.1 Display "Filter Properties Dialog Window" In Common Software.... 16

10.2 “Device” Instruction.....17

10.3 HD Capture Device "Advanced Settings" Instruction..... 19
10.3.1 Input Signal..... 19
10.3.1.1 Input Interface.....19
10.3.1.2 Signal Status.....20
10.3.2 Image Adjustment.....20
10.3.3 Image Output.....21
10.4 SD Capture Device" Advanced Video Settings" Instruction.....22
10.5 "Color Adjustment" Instruction.....23
11 Video Formats Setting.....23
11.1 Display "Filter Output Pin" In Common Software..... 24
11.2 "Out Format" Instruction.....24
12 Audio Capture Device Instruction.....24
12.1 Windows XP, Windows 2003..... 25
12.2 Windows Vista, Windows 7, Windows 2008, Windows 2008 R2.....26
13 Compatible Software Instruction.....27
Appendix.....28
A. Related Documents.....28
Appendix 1. Cyclone IV E components serial resources.....28
Appendix 2. Cyclone IV E components Packaging Products.....28
Appendix 3. Cyclone IV E components series of speed grade.....29
Appendix 4. Cyclone IV components series of M9K module data width.....30
Appendix 5. Cyclone IV components series support I/O standard.....30
Appendix 6. Cyclone IV components serial configuration solution.....30
Appendix 7. Cyclone IV components package products information.....31
B. Terms and Abbreviations.....32
C. Safety Caution.....33
Contact us:.....34

Table Index

Table 1 SVP242E Dual-Channel HD + Four-Channel SD Video Capture Card Product Specifications.....10

Table 2 SVP242E Dual-Channel HD + Four-Channel SD Video Capture Card Parts List.....12

Figure Index

Figure 1, DVI signal connection sketch map....13
Figure 2, HDMI signal connection sketch map....13
Figure 3, VGA signal connection sketch map....14
Figure 4, YPbPr signal connection sketch map....14
Figure 5, CVBS connection sketch map....14
Figure 6, CVBS on connection of SD interface sketch map....15
Figure 7, Audio line in signal connection sketch map....15
Figure 8, Device Properties tab....17
Figure 9, "Advanced Settings " page....19
Figure 10, Auto pop-up menu....20
Figure 11, SD Capture Device" Advanced Video Settings" page....22
Figure 12， HD device "Color Adjustment" properties page....23
Figure 13, "Properties" page....24
Figure 14， Windows XP/2003"VolumeControl"-"Properties" dialogue....26
Figure 15, Windows Vista/7 recording device properties dialog windows....27

1 Preface

Thank you for purchasing SVP242E HD video capture adapter!

The SVP242E is featured with small and exquisite bulk, superior performance and flexible characteristics. The SVP242E capture adapter can simultaneously capture two High-Definition video signals, four Standard-Definition video signals, and two stereo analog audio signals. The HD input can connect with HDMI, DVI, YPbPr, VGA (RGB-HV), composite video broadcast signal (CVBS).

The user's guide will provide with necessary instruction for proper use of SVP242E.

2 Product introduction

2.1 Product Feature

- Simultaneously capture two High-Definition video signals, four Standard-Definition video signals, and two stereo analog audio signals.
- 1080p/60 Hz for input signal.
- HD signal can capture DVI, VGA, HDMI, YPbPr.
- Capture LPCM audio signal via HDMI.
- Microsoft AVStream standard driver, support most multi-media video software or stream media software.

[Please note]:

Because of copyright protection, you cannot use the product for capturing copyright protection of audio and video signals.

2.2 Advanced Feature

- DMA transmission with high performance.
- HD input can switch signal dynamically, signals include DVI/HDMI, VGA, and YPbPr.
- HD input can be compatible with CVBS.
- HD input supports automatic detection of input video format, automatic detection of the effective area of video, automatic phase adjustment of capturing VGA.
- Offer safe mode for VGA signal, capture VGA signal which max line sampling number is not more than 4095.
- HD input supports setting effective image area manually, it can be used for image flipping and supporting for the timing of special input signal.
- HD input supports for multi-stage image zoom and provides with three scales for image aspect ratio.
- Deinterlace supports Vertial Blend and Motion Adaptive.
- Hardware color conversion, it can output RGB24，RGB32，YUY2，UYVY，I420.
- HD input supports color adjustment, it can adjust image brightness, contrast, hue, saturation, Gamma; also R, G, B brightness and contrast can be adjusted separately.
- HD input supports image vertial flip and mirror.
- A computer can install multiple cards, multiple cards can capture signals synchronously, each signal can be set separately.
- The firmware can upgrade.

2.3 Product Specifications

Board Size	117mm x 102.8mm
Host Interface	PCI-Express x4, Half-length, *700MB/s transmission bandwidth
Input Interface	1 DMS59 interface 1 DB9 interface

Maximum Sampling Rate	RGB/YPbPr: 170MHz HDMI/DVI: 225MHz
Onboard Memory	256MB DDR2, 160 MHz of working frequency, 64bit of bit wide
VGA Input Format	640x400-2048x1536, pixel rate is under 170MHz, Offer safe mode, capture non-regular resolution.
DVI Input Format	Up to DVI 1.0 standard, single continuity
HDMI Input Format	Up to HDMI 1.3 standard, support 36bit DeepColor
CVBS Input Standard	PAL/NTSC
HD Output Image Format	Size: 40x30-2048x1536, frame rate: 1-100 fps, color: YUY2, UYVY, RGB24, RGB32, I420
SD Output Image Format	Size: 176x144-768x576, frame rate: 1-30fps, color: YUY2, UYVY, RGB24, RGB32, I420
Operating System Support	Support following operating systems (x 86 version or x64 version) : Windows® XP Professional Windows® Server 2003 Windows Vista®, Windows® Server 2008 Windows® 7 Windows® Server 2008 R2
Power Consumption	<= 5W
Operating Temperature	0 to 50 deg C
Storage Temperature	-20 to 70 deg C
Relative Humidity	5% to 90%

Table 1 SVP242E Dual-Channel HD + Four-Channel SD Video Capture Card Product Specifications

2.4 Standard Accessory

DVI-I to HDMI +YPbPr Breakout Cable	2
DVI-I to VGA Adapter	2
DMS59 to DVI-I Breakout Cable	1
DB9 to 4 CVBS+2 stereo audio Breakout Cable	1

[Please note]:

1. PCI-Express actual transmission bandwidth relates with the host chipsets and motherboard, it may be lower than written value here.
2. The actual output frame rate is limited by PCI-Express interface bandwidth, it may be less than setting value.

3 Minimum Hardware Configuration

- Intel Core Solo
- 1G of RAM
- Available PCI-Express x4 expansion slot on motherboard

4 Recommended Hardware Configuration

- Intel Core i5
- 2G of RAM
- Available PCI-Express x4 expansion slot on motherboard

5 System Requirements

System should be one of the following systems (x 86 version or x64 version):

- Microsoft Windows XP
- Microsoft Windows Server 2003
- Microsoft Windows Vista

- Microsoft Windows Server 2008
- Microsoft Windows 7
- Microsoft Windows Server 2008 R2

6 Hardware and Driver Installation

Please contrast parts list and parts in package to confirm that there is no lack of any parts.

6.1 Parts List

Parts	Number
SVP242E Capture Card	1
DVI-I to HDMI +YPbPr Breakout Cable	2
DVI-I to VGA Adapter	2
DMS59 to DVI-I Breakout Cable	1
DB9 to 4 CVBS+2 stereo audio Breakout Cable	1
Driver Installation CD	1
Installation Guide(the document)	1
Quality Guarantee Specifications	1

Table 2 SVP242E Dual-Channel HD + Four-Channel SD Video Capture Card Parts List

6.2 Install SVP242E:

1. Power off the computer.
2. Discharge any static electricity build up in your body by touching a large grounded metal surface or the computers' case (if plugged in) for few seconds; or wear an antistatic wrist strap.
3. Put SVP242E into the computer PCI-Express slot. The card can be putted into PCI-Express x4 or x16 slot.(Note: the x16 slot in some motherboard is exclusive use for graphics card,

the capture card may be not identified correctly)

4. Power on the computer to start the operating system.
5. Cancel the “find new hardware” image that the operating system prompts.
6. Insert the driver CD-ROM and run Autorun.exe in CD-ROM root directory.
7. Click the installation program and follow prompts to carry on remaining operations.
8. Run “AmCap.exe” in CD to check whether success after installation.

7 Connection of HD Input

7.1 DVI-D/DVI-I Signal

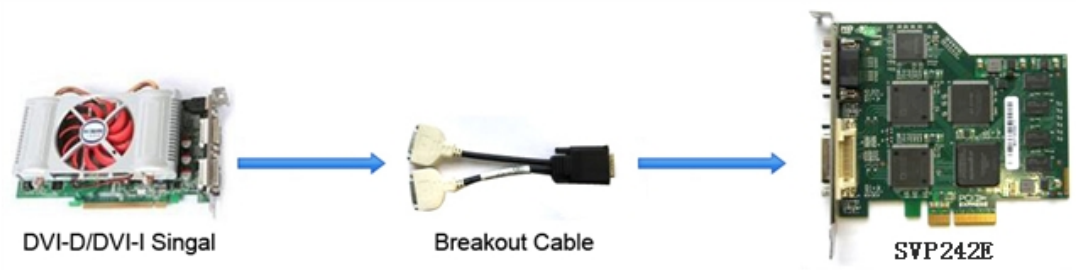


Figure 1, DVI signal connection sketch map

7.2 HDMI Signal

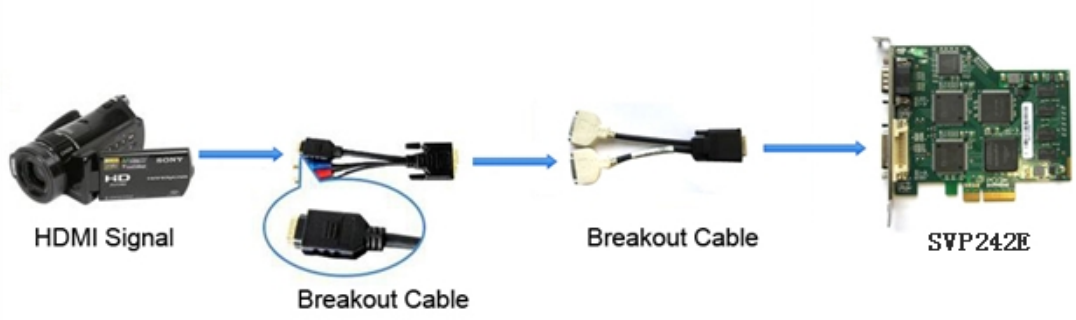


Figure 2, HDMI signal connection sketch map

7.3 VGA Signal（RGB-HV）

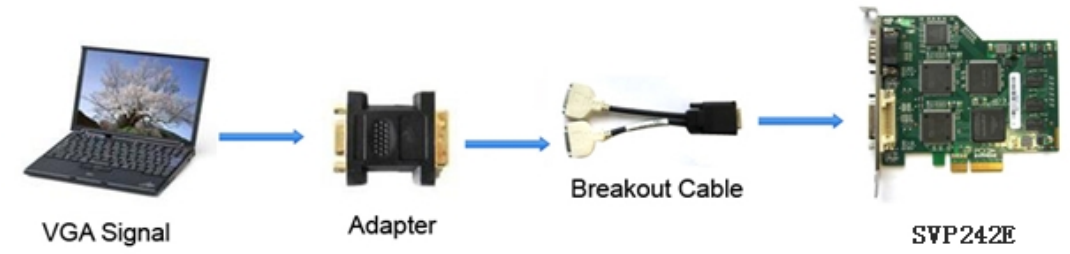


Figure 3, VGA signal connection sketch map

7.4 YPbPr Signal

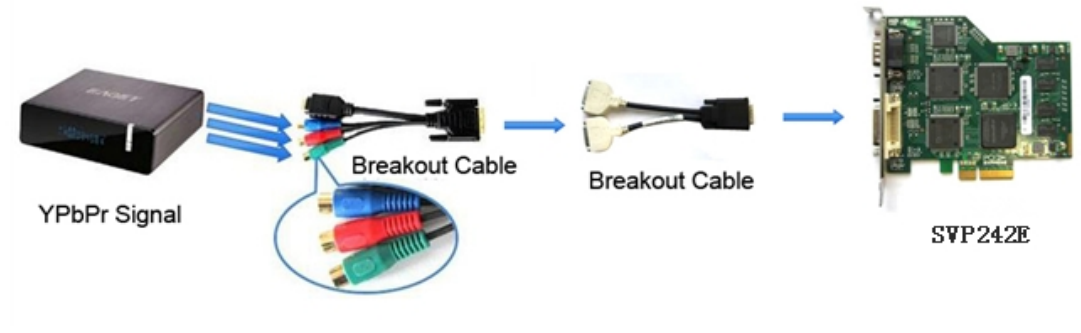


Figure 4, YPbPr signal connection sketch map

7.5 CVBS

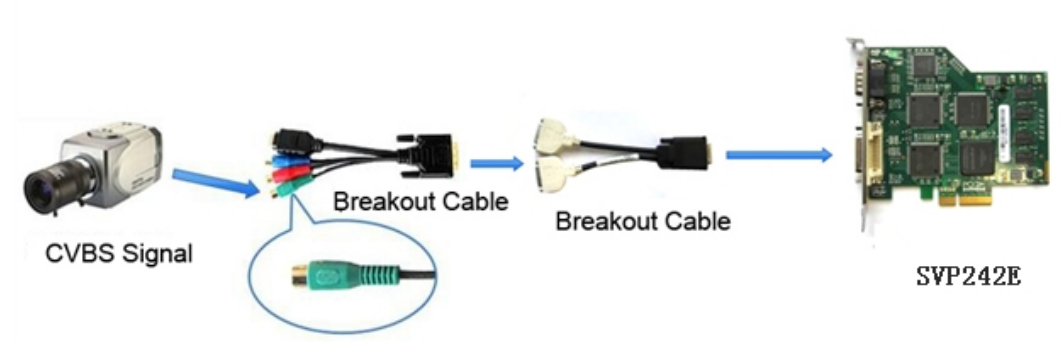


Figure 5, CVBS connection sketch map

8 Connection of SD Input

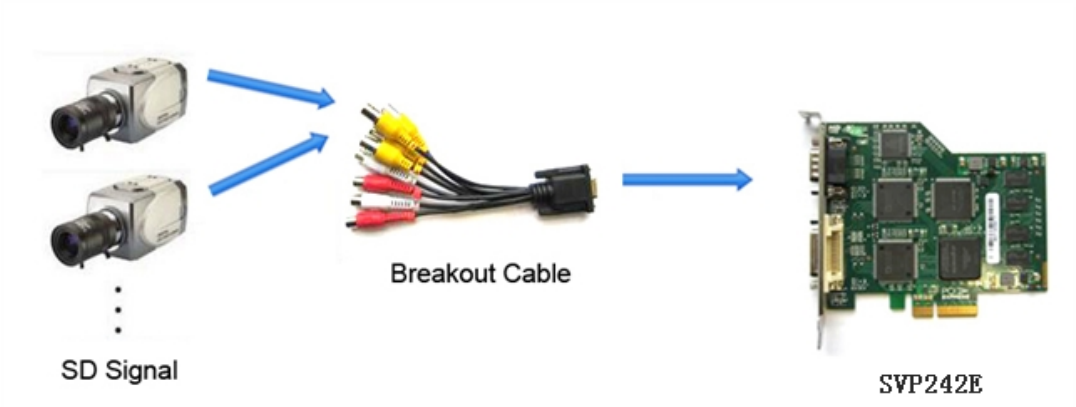


Figure 6, CVBS on connection of SD interface sketch map

9 Connection of Audio Signal

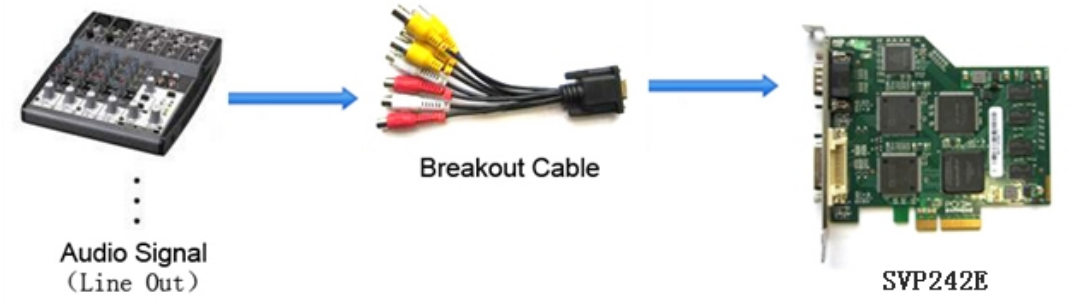


Figure 7, Audio line in signal connection sketch map

[Notes]:

The audio signal input is up to" **Line in**" level standard, if you need to connect microphone , must connect microphone with microphone input of "**microphone amplifier**" or "**mixer**" , and then "**microphone amplifier**" or " **mixer** "output is connected to the interface.

10 Video Capture Device Instruction

SVP242E is based on Microsoft DirectShow interface, six video devices will be increased in operating system after installation:

- HD Video 1(SVP242E Adapter x), HD capture device
- HD Video 2(SVP242E Adapter x), HD capture device
- Video 1 (SVP242E Adapter x), SD capture device
- Video 2 (SVP242E Adapter x), SD capture device
- Video 3 (SVP242EAdapter x), SD capture device
- Video 4 (SVP242E Adapter x), SD capture device

The HD Video1/2 (SVP242E Adapter x) is corresponding to DMS59 HD input interface; Video 1 / 2 /3/4(SVP242E Adapter x) is corresponding to four yellow video BNC interface in SD breakout cable.

SVP242E not only offers basic options, such as image brightness, contrast, hue, saturation, Gamma and so on, but also provide additional options for setting function. You can use "**Filter Properties dialog window**" in DirectShow to set these options.

10.1 Display "Filter Properties Dialog Window" In Common Software

AMCAP: Double click "**AmCap.exe**", choose HD video device "**HD Video 1 (XI204XE Adapter1)**" in "**Devices**" menu, then click "**Video Capture Filter ...**" in "**Settings**" menu, pop-up " **Filter Properties dialog window**".

10.2 “Device” Instruction

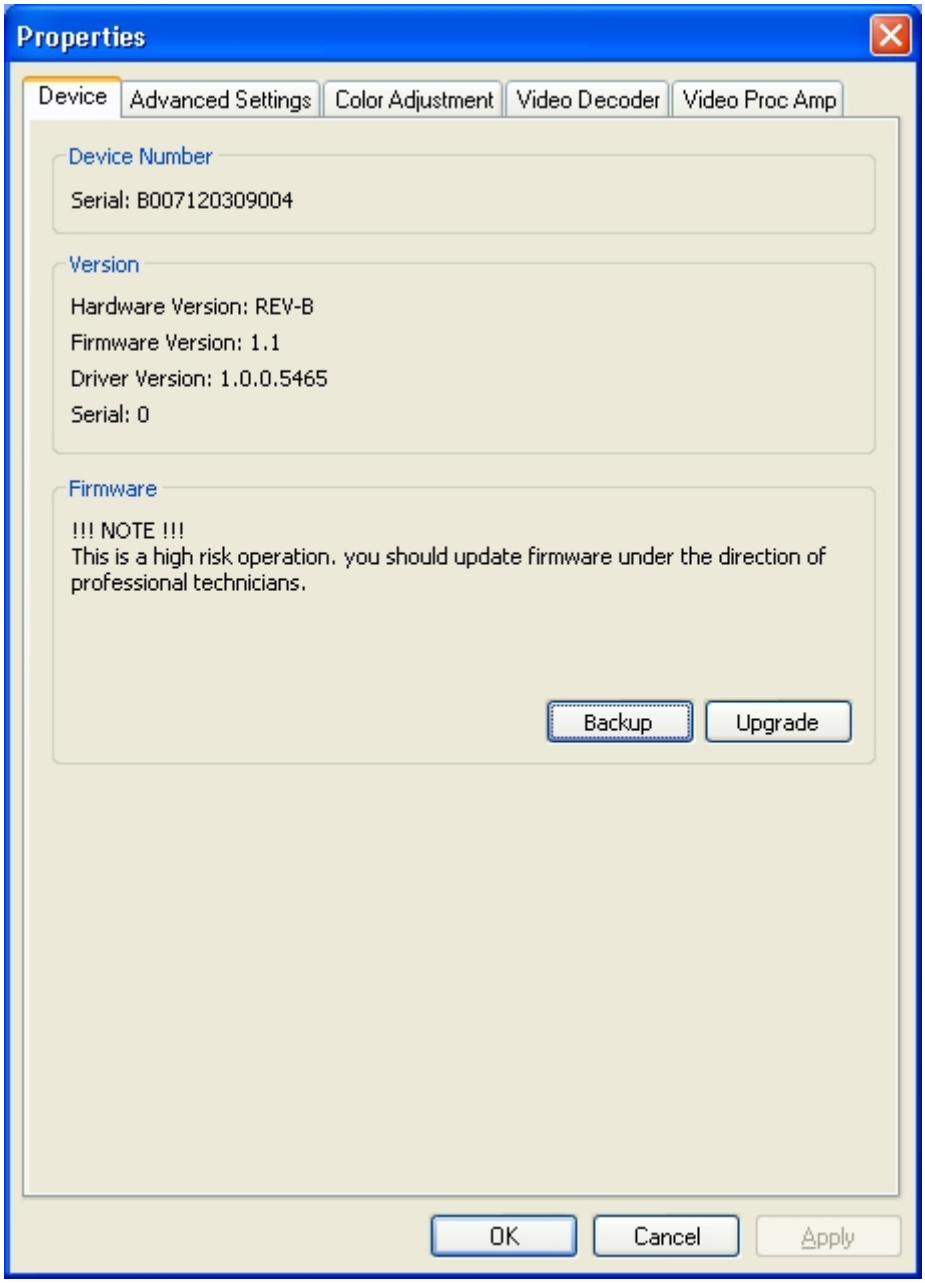


Figure 8, Device Properties tab

Device Number: display serial of SVP242E, the number should be accorded with the barcode on the card.

Version: display related version number, versions include hardware version, firmware version,

driver version, and device serial. You may request user to provide relevant version number when you solve problems.

Firmware: if new features need to upgrade the firmware, we should first backup it and then upgrade the firmware.

[Notes]:

The different versions of the firmware and hardware cannot be mixed together, or else it will get error when upgrade. Additionally, do not power outage in the process of firmware upgrade, otherwise it will lead to upgrade firmware fail, then the capture card will not work. You have to return the capture card back to factory for being repaired.

10.3 HD Capture Device "Advanced Settings" Instruction

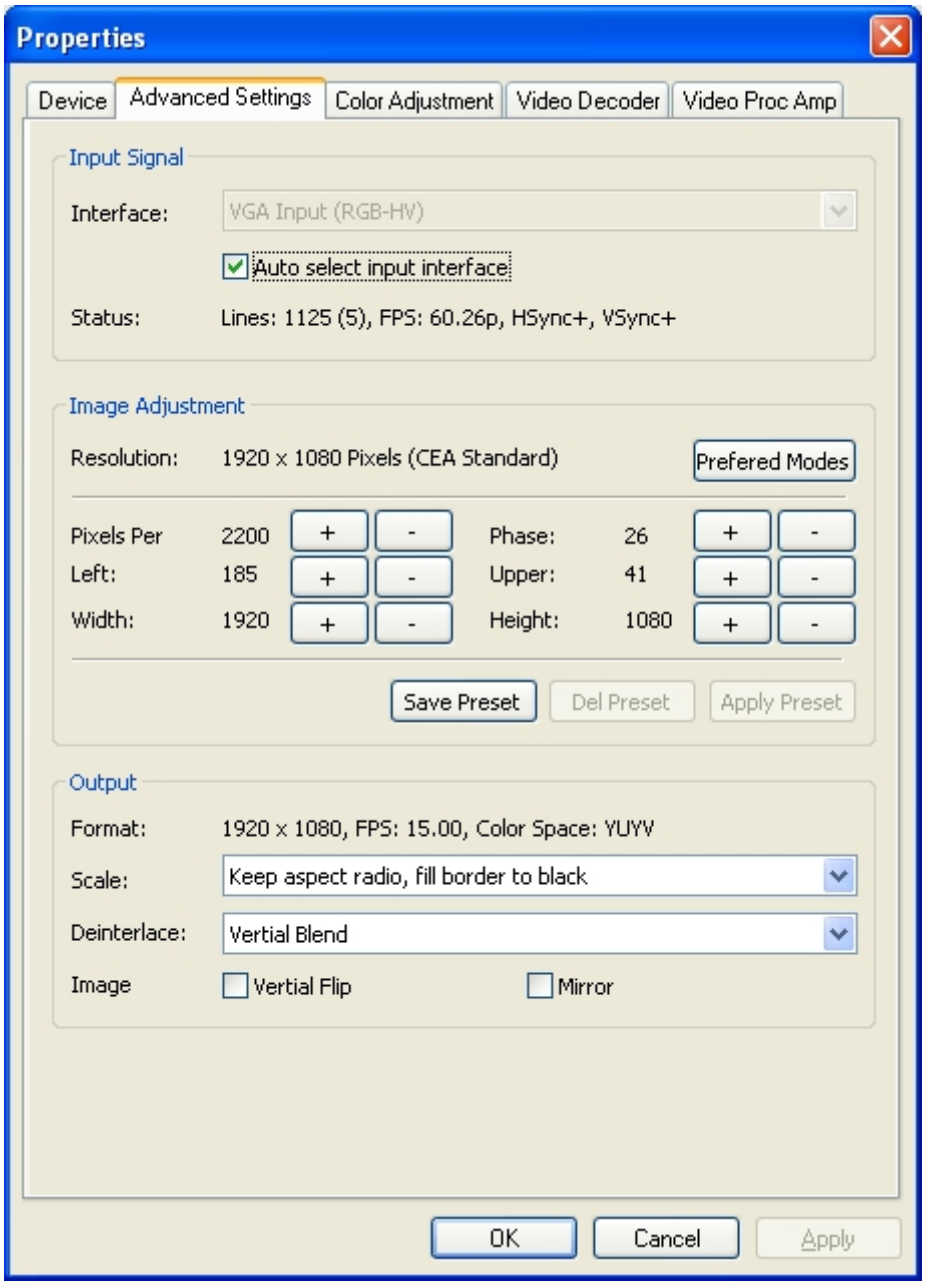


Figure 9, "Advanced Settings " page

10.3.1 Input Signal

10.3.1.1 Input Interface

By default, select "**Auto Select Input Interface**", supporting input interface includes: DVI / HDMI input, VGA input, YPbPr input, CVBS input.

[Notes]:

when "**Auto Select Input Interface**" is selected, if HDMI and YPbPr input interfaces both have signal access, then HDMI input is preferred. You must select CVBS input manually, otherwise it will be identified with component input. Signal must access Y interface (green RCA interface). In fact, the capture card can capture 6 SD signals coupled with other four CVBS inputs which XI204XE offers.

10.3.1.2 Signal Status

The relevant parameters of signal are shown, such as total number of rows, frame rate (p is progressive scan, i is interlaced), mode, audio frequency.

10.3.2 Image Adjustment

By default, image is auto, but auto cannot achieve desired effect, such as black border, unclear image, picture which needs clipping, it must be adjusted manually. After adjustment, you can save the preset. Then you can apply preset values without adjustment when the same signal accesses.

[For example as VGA signal adjustment]:

Black border adjustment: Through adjust left margin and top margin to eliminate black border. Every time you can adjust 1 pixel.

Text definition adjustment: adjust line number of samples and sampling phase to achieve desired definition of text.

Select correct resolution quickly: the capture card cannot identify correct resolution with the same number of rows, such as 1024x768, 1280x768, 1360x768, 1368x768, lines are all 768, auto may be all identified as 1024x768, then click "**auto**", a list will pop up as shown below, user can select the correct resolution.

1024 x 768 Pixels (GTF Standard)
1280 x 768 Pixels (GTF Standard)
1360 x 768 Pixels (GTF Standard)
1368 x 768 Pixels (GTF Standard)

Figure 10, Auto pop-up menu

Image clipping: Through adjust image width, height, left margin and top margin to achieve desired requirement. Increasing/reducing width of image starts from right, increasing/reducing height of image starts from bottom.

[Skills of image clipping as follows]:

1. Set scale “fill output image” to confirm whether clipping adjustment is appropriate.
2. Cut off image left: firstly increase left margin, then reduce image width.
3. Cut off image right: reduce image width.
4. Cut off image top: firstly reduce image height, and then increase top margin.
5. Cut off image bottom: reduce image height.

After image adjustment completes, click "**Save Preset**" to save current adjustment; click "**Del preset**" to delete preset you saved; click "**Apply Preset**" to apply the saved preset to current settings.

10.3.3 Image Output

Display output format of current image, set image zoom scale, deinterlace and image flipping.

- **Format:** display output image size, frame rate, color format.
- **Scale:** provide three ways, full output image and keep aspect ratio, fill border to black and keep aspect ratio, clip border.
- **Deinterlace:** vertial blend, motion adaptive. Motion adaptive is better, but it takes up high CPU usage, also you can selcet “disabled”.
- **Image :** offer two ways, vertial flip and mirror.

10.4 SD Capture Device" Advanced Video Settings" Instruction

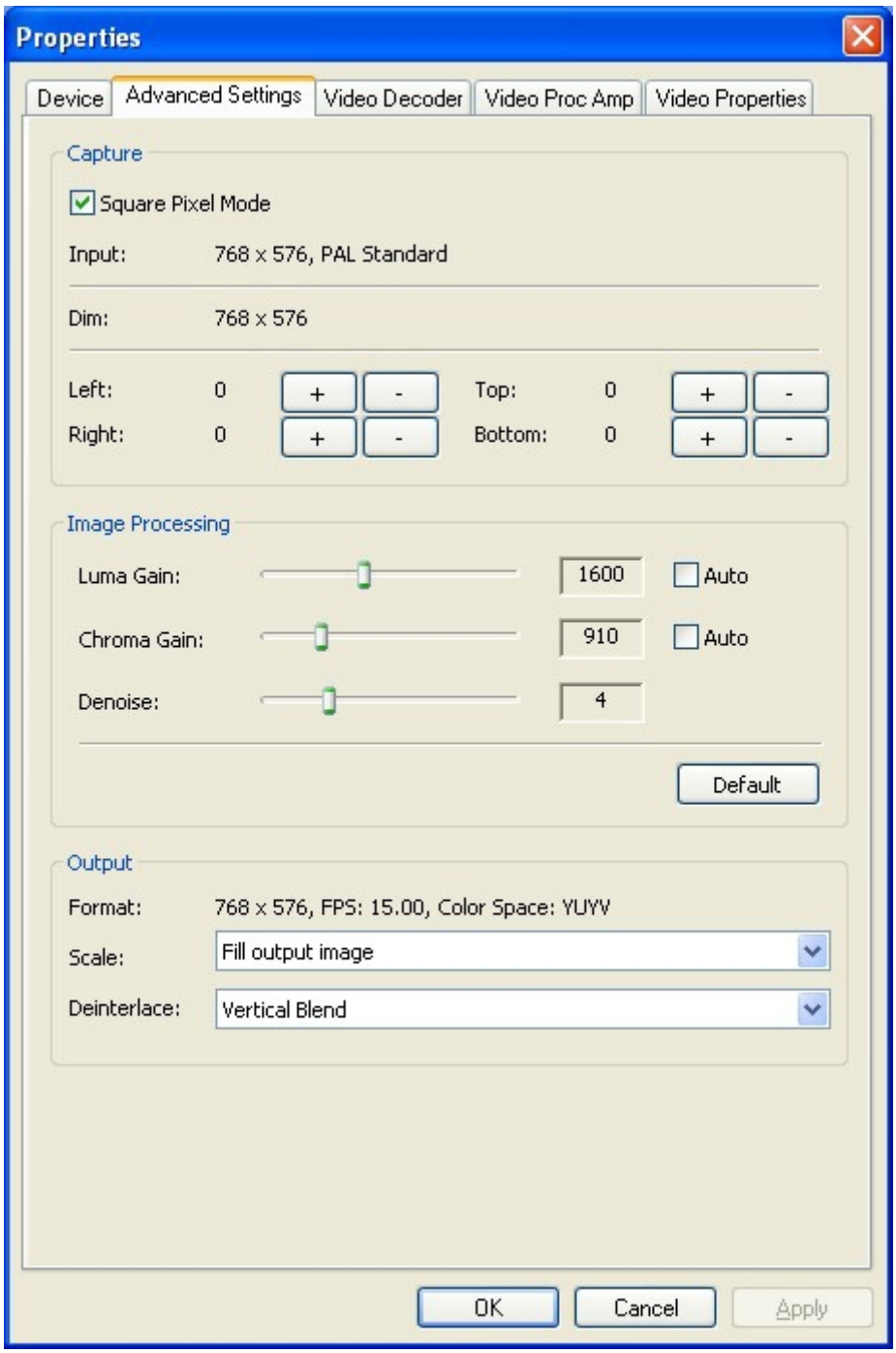


Figure 11, SD Capture Device" Advanced Video Settings" page

SD capture device" Advanced Video Settings" is unified with HD capture device, except input interface has only CVBS.

10.5 "Color Adjustment" Instruction

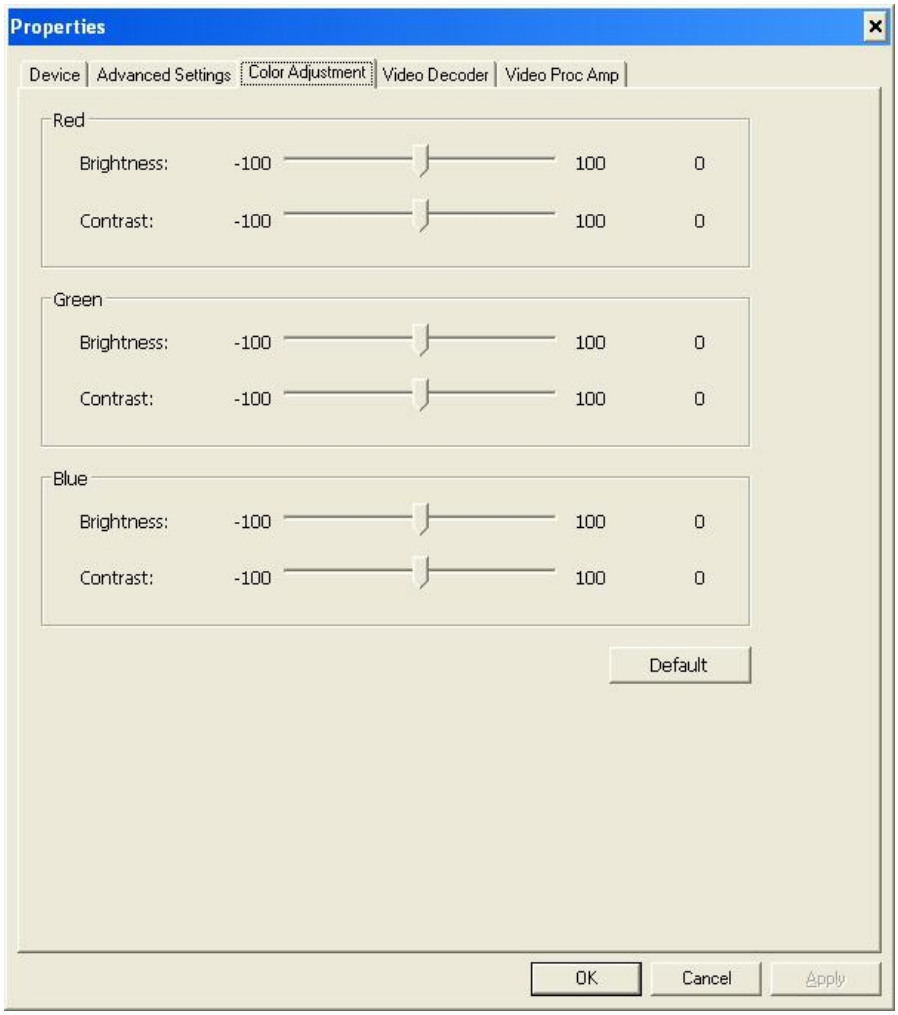


Figure 12， HD device "Color Adjustment" properties page

Here can be adjusted R, G, B brightness and contrast separately, click "**Default**" to restore default values.

11 Video Formats Setting

Driver is redefined "**Filter Output Pin**" interface and unified standard for SD and HD. Output resolution can be any size, even special resolution which is cut.

11.1 Display "Filter Output Pin" In Common Software

- **AMCAP:** Double click "**AmCap.exe**", choose HD video device "**HD Video (SVP242E Adapter1)**" in "**Devices**" menu, then click "**Video Capture Pin ...**"in "**Settings**" menu, pop-up " **Filter Output Pin** ".

11.2 "Out Format" Instruction

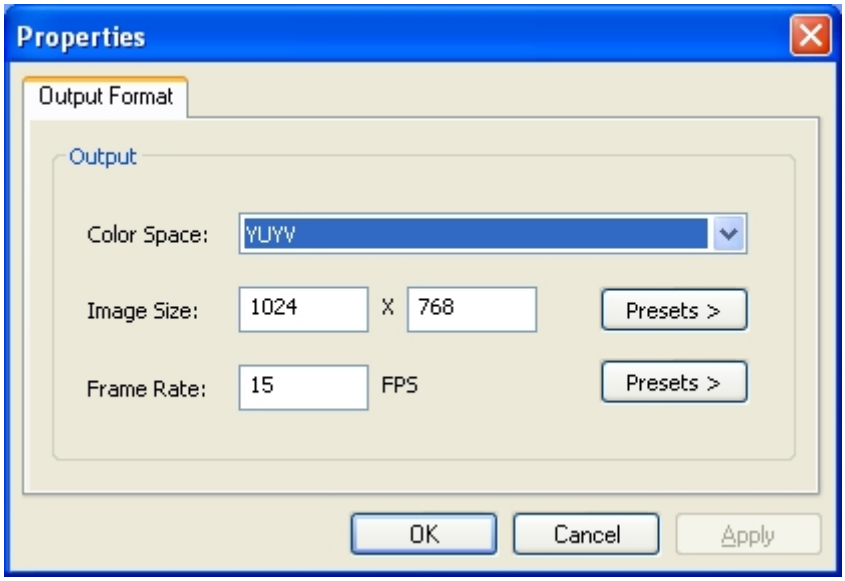


Figure 13, "Properties" page

Color Space: offer five color formats, YUYV, UYVY, I420, RGB 24 Bits, and RGB 32 Bits.

Image Size: set image size of output, it can be written manually, or select output resolution from "**Presets**", the bold font resolution at the top is the same as capture image, it is the best resolution.

Frame Rate: set output frame rate, it can be written manually, or select from "**Presets**". If application software is set output frame rate, now setting is no effect, when you open again, it will return frame rate in application software.

12 Audio Capture Device Instruction

SVP242E is based on the Microsoft DirectShow interface. After installation in operating system, the relevant audio devices will be added on. Any software which is compatible with DirectSound, software with DirectShow can use the devices for capturing sound, it is recorded

voice which HDMI and analog line are mixed. Also "**Volume**" and "**Mute**" in HDMI and analog line can be controlled independently.

12.1 Windows XP, Windows 2003

The name of audio capture device under Windows XP, Windows 2003:

- Audio 1(SVP242E Adapter x)
- Audio 2(SVP242 Adapter x)

Through system "**Volume Control**" to adjust recording volume, specific steps as follows:

1. In system notification icon area on right corner double-click " " button to pop-up "**Open Volume Control**" window.
2. Open "**Options**" menu, select "**Properties**" menu item.
3. In "**Mixer device**", select "**Audio 1(SVP242E Adapter x)**", click "**OK**" button.
4. Corresponding volume control project will be displayed, this time you can operate volume and "**quiet**" according to your requirement.

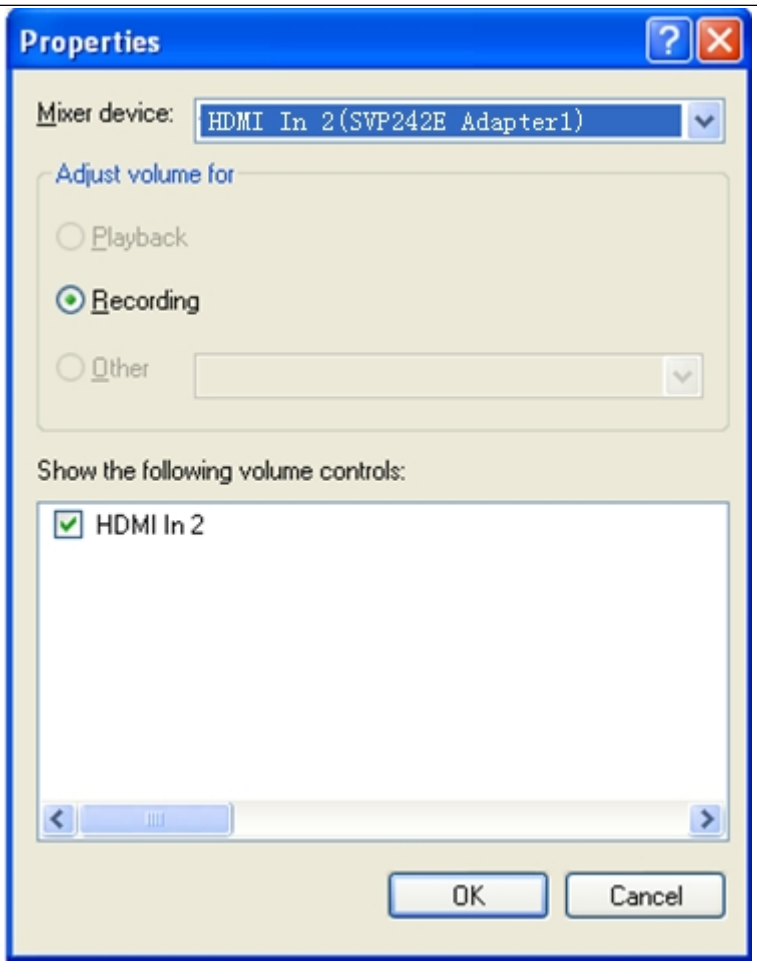


Figure 14， Windows XP/2003"VolumeControl"-"Properties" dialogue

12.2 Windows Vista, Windows 7, Windows 2008, Windows 2008 R2

Under such operating systems, each capture card will show two audio capture devices:

- HDMI In (SVP242E Adapter x)
- Line In (SVP242E Adapter x)

Through system "**Volume Control**" to adjust the recording volume, specific steps as follows:

1. In system notification icon area on right corner right-click " "button, select "**Recording devices**" in pop-up menu.
2. In pop-up list which displays recording device, select "**HDMI In**" or "**Line In**", click "**Properties**" button, system will pop up device properties dialog window.
3. In Properties dialog box, select "**Levels**" property page, then you can operate volume control

and "**Quiet**" according to your requirement.

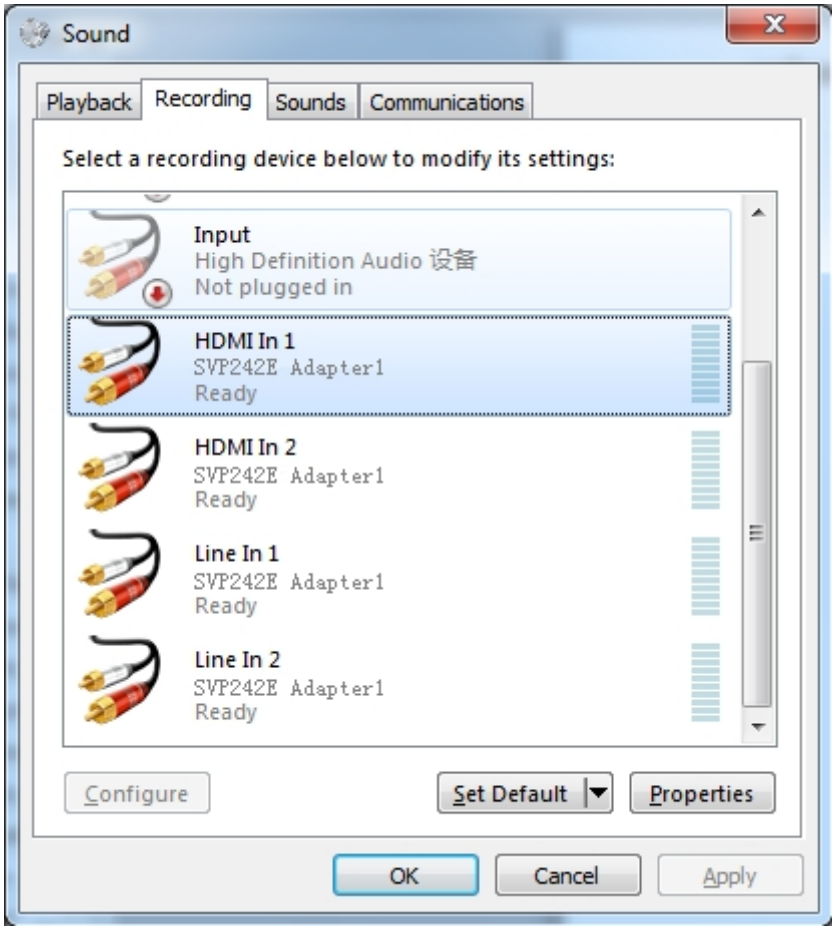


Figure 15, Windows Vista/7 recording device properties dialog windows

13 Compatible Software Instruction

SVP242E can be compatible with variety of audio and video capture software which is based DirectShow interface, and audio capture software which is based DirectSound interface, such as:

- Windows Media Encoder
- Adobe Flash Media Live Encoder
- Real Producer Plus
- VideoLAN for Windows

Appendix

A. Related Documents

Appendix 1. Cyclone IV E components serial resources

resource	EP4CE6	EP4CE10	EP4CE15	EP4CE22	EP4CE30	EP4CE40	EP4CE55	EP4CE75	EP4CE115
Logical unit (LE)	6,272	10,320	15,408	22,320	28,848	39,600	55,856	75,408	114,480
Embedded memory(Kbits)	270	414	504	594	594	1,134	2,340	2,745	3,888
Embedded 18*18 multiplying unit	15	23	56	66	66	116	154	200	266
Interchangeable PLL	2	2	4	4	4	4	4	4	4
Global clock networks	10	10	20	20	20	20	20	20	20
User I/O piece	8	8	8	8	8	8	8	8	8
Maximum user I/O (Note 1)	179	179	343	153	532	532	374	426	528

[Note]:

User I / O pins in pin list file include all common I / O pins, dedicated clock pins and dual- configuration pins. Transceiver pins and dedicated configuration pins are not included in the pin list.

Appendix 2. Cyclone IV E components Packaging Products

Package	E144		M164		U256		F256		U484		F484		F780	
Size(mm)	22 × 22		8 × 8		14 × 14		17 × 17		19 × 19		23 × 23		29 × 29	
Pacing(mm)	0.5		0.5		0.8		1.0		0.8		1.0		1.0	
Devices	User I/O	LVDS(Note 2)	User I/O	LVDS(Note 2)	User I/O	LVDS(Note 2)	User I/O	LVDS(Note 2)	User I/O	LVDS(Note 2)	User I/O	LVDS(Note 2)	User I/O	LVDS(Note 2)
EP4CE6	↑91	21	—	—	↑179	66	↑179	66	—	—	—	—	—	—
EP4CE10	91	21	—	—	179	66	179	66	—	—	—	—	—	—
EP4CE15	81	18	↕89	21	165	53	165	53	—	—	↑343	137	—	—
EP4CE22	↓79	17	—	—	↓153	52	↓153	52	—	—	—	—	—	—
EP4CE30	—	—	—	—	—	—	—	—	—	—	328	124	↑532	224
EP4CE40	—	—	—	—	—	—	—	—	↑328	124	328	124	532	224
EP4CE55	—	—	—	—	—	—	—	—	324	132	324	132	374	160
EP4CE75	—	—	—	—	—	—	—	—	↓292	110	292	110	426	178
EP4CE115	—	—	—	—	—	—	—	—	—	—	↓280	103	↓528	230

[Note]:

(1) E144 package has an exposed substrate at the bottom, the exposed substrate connect ground ,it must be connected to the PCB ground surface. Use it for for circuit connection, rather than for temperature processing purposes.

(2) that includes a dedicated LVDS pairs, including pseudo-LVDS pairs. For more information.

Appendix 3. Cyclone IV E components series of speed grade

Devices	E144	M164	U256	F256	U484	F484	F780
EP4CE6	C8L, C9L, I8L C6, C7, C8, I7, A7	—	I7N	C8L, C9L, I8L C6, C7, C8, I7, A7	—	—	—
EP4CE10	C8L, C9L, I8L C6, C7, C8, I7, A7	—	I7N	C8L, C9L, I8L C6, C7, C8, I7, A7	—	—	—
EP4CE15	C8L, C9L, I8L C6, C7, C8, I7	I7N	I7N	C8L, C9L, I8L C6, C7, C8, I7, A7	—	C8L, C9L, I8L C6, C7, C8, I7, A7	—
EP4CE22	C8L, C9L, I8L C6, C7, C8, I7, A7	—	I7N	C8L, C9L, I8L C6, C7, C8, I7, A7	—	—	—
EP4CE30	—	—	—	—	—	C8L, C9L, I8L C6, C7, C8, I7, A7	C8L, C9L, I8L C6, C7, C8, I7
EP4CE40	—	—	—	—	I7N	C8L, C9L, I8L C6, C7, C8, I7, A7	C8L, C9L, I8L C6, C7, C8, I7
EP4CE55	—	—	—	—	I7N	C8L, C9L, I8L C6, C7, C8, I7	C8L, C9L, I8L C6, C7, C8, I7
EP4CE75	—	—	—	—	I7N	C8L, C9L, I8L C6, C7, C8, I7	C8L, C9L, I8L C6, C7, C8, I7
EP4CE115	—	—	—	—	—	C8L, C9L, I8L C7, C8, I7	C8L, C9L, I8L C7, C8, I7

[Note]:

(1) C8L, C9L and I8L speed grade for 1.0 V core voltage.

(2) C6, C7, C8, I7, and A7 speed grades for 1.2 V core voltage.

Appendix 4. Cyclone IV components series of M9K module data width

Model	Date width settle
Single-port or simple Dual-port	×1, ×2, ×4, ×8/9, ×16/18, 和 ×32/36
True Dual-port	×1, ×2, ×4, ×8/9, 和 ×16/18

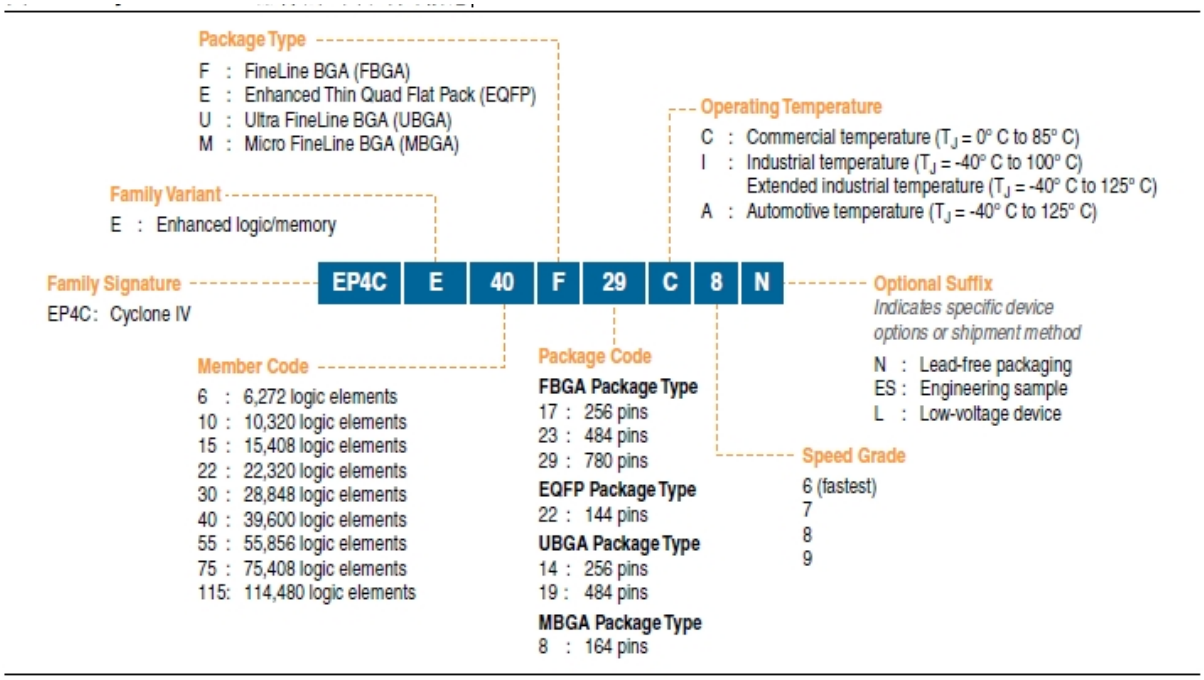
Appendix 5. Cyclone IV components series support I/O standard

Model	I/O standard
Single-port I/O	LVTTL, LVCMOS, SSTL, HSTL, PCI, 和 PCI-X
Differential I/O	SSTL, HSTL, LVPECL, BLVDS, LVDS, mini-LVDS, RSDS, and PPDS

Appendix 6. Cyclone IV components serial configuration solution

Devices	Supported configuration solution
Cyclone IV GX	AS, PS, JTAG, and FPP (Note 1)
Cyclone IV E	AS, AP, PS, FPP, and JTAG

Appendix 7. Cyclone IV components package products information


Package Type
F : FineLine BGA (FBGA)
E : Enhanced Thin Quad Flat Pack (EQFP)
U : Ultra FineLine BGA (UBGA)
M : Micro FineLine BGA (MBGA)
Operating Temperature
C : Commercial temperature (TJ = 0° C to 85° C)
I : Industrial temperature (TJ = -40° C to 100° C)
Extended industrial temperature (TJ = -40° C to 125° C)
A : Automotive temperature (TJ = -40° C to 125° C)
Family Variant
E : Enhanced logic/memory
Family Signature
EP4C: Cyclone IV
EP4C E 40 F 29 C 8 N
Optional Suffix
Indicates specific device options or shipment method
N : Lead-free packaging
ES : Engineering sample
L : Low-voltage device
Member Code
6 : 6,272 logic elements
10 : 10,320 logic elements
15 : 15,408 logic elements
22 : 22,320 logic elements
30 : 28,848 logic elements
40 : 39,600 logic elements
55 : 55,856 logic elements
75 : 75,408 logic elements
115: 114,480 logic elements
Package Code
FBGA Package Type
17 : 256 pins
23 : 484 pins
29 : 780 pins
EQFP Package Type
22 : 144 pins
UBGA Package Type
14 : 256 pins
19 : 484 pins
MBGA Package Type
8 : 164 pins
Speed Grade
6 (fastest)
7
8
9

B. Terms and Abbreviations

Abbreviation	Description
HDMI	High-Definition Multimedia Interface
YPbPr	Component Video Connector
CVBS	Composite Video Broadcast Signal
VGA	Video Graphics Array
DVI	Digital Visual Interface

C. Safety Caution

In the process of use or repair any equipment by SYSTECH need to pay attention to the following safe guard. Terminal equipment shall inform the security of user information below. Otherwise, SYSTECH technology will not bear any because the user did not press these warnings and consequences.

Contact us:

SYSTECH
Address: 702, Block A, Tsinghua Hi-Tech Park, Nanshan, Shenzhen, China
Tel: 400-993-9390
Fax: 86-755-2603 0411
Post code: 518057
www.sysembed.com